* WLC EVALUATOR™

Whole Life Cost Evaluator (WLC Evaluator) user manual revision 1.0

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PART 1: INTRODUCTION TO WLC EVALUATOR

1.1. Introduction

This instruction manual should be used for the operation of the Whole Life Cost Evaluator (WLC Evaluator). The WLC Evaluator software will enable the user to estimate whole life costs (WLC) in accordance with a "methodology for the systematic economic consideration of all whole life costs and benefits over a period of analysis, as defined in the agreed scope" (BS ISO 15686-5). Whole life costing can be defined as a technique for examining and determining all the costs in monetary terms - direct and indirect, of designing, constructing, maintenance, operation, occupancy, end of life/disposal, non-construction costs, income and externalities. Whole life cost analysis is an economic and engineering evaluation tool for choosing among alternative building design options by comparing all of the different design/build, operation, and maintenance cost options over a given time period in equivalent economic terms. This is shown in Figure 1.

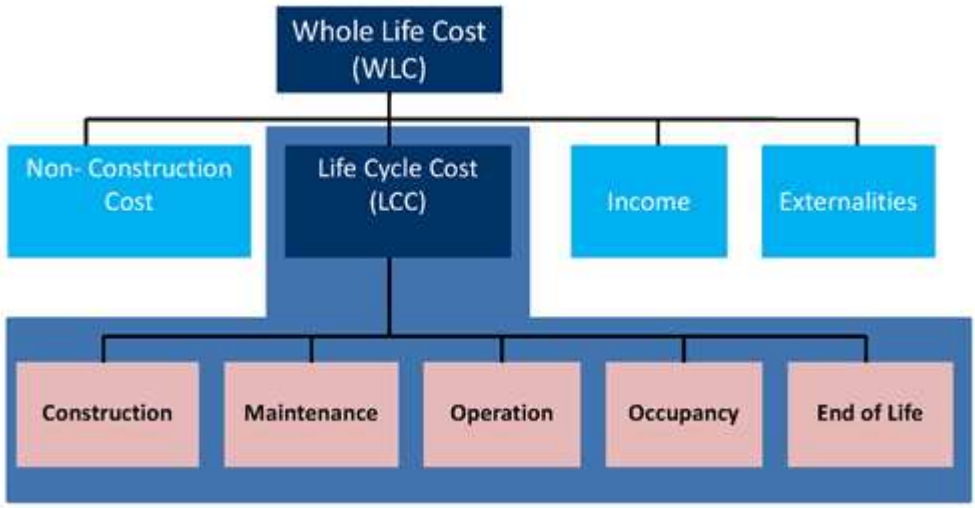


Figure 1 – Element of whole life cost (source: ISO 15686-5)

WLC Evaluator is a powerful software tool used to evaluate investment options, by considering all the relevant costs of ownership over a defined time span – not just construction costs but also maintenance costs, operation costs, occupancy costs, end of life costs, non-construction costs, income and externalities. It has the capability to build models of WLC of any project or product, eg. schools, hospitals, housing, petrochemical plant, heat pumps, generation etc.

WLC Evaluator will also enable the user to estimate life cycle costs (LCC) defined as "the cost of an asset, or its parts throughout its life cycle, while fulfilling the performance requirements" (BS ISO 15686-5). Life cycle costing can be defined as a technique for examining and determining all the costs in money terms - direct and indirect, of designing, constructing, maintenance, operation, occupancy, and end of life/disposal costs. The purpose of the LCC analysis is to provide the ability to compute the cost of a construction investment over its entire life span.

1.2. WLC calculations

A typical WLC cost calculation would be the calculation of the total costs at specified periods of a building over its entire life span. However, a life cycle cost analysis can also be used to perform other calculations such as the calculation of net present value (NPV), a unitary charge or a sensitivity analysis.

1.2.1. Net present value

NPV is defined as the sum of money that needs to be invested today to meet all future financial requirements as they arise throughout the life of the investment. It represents a single figure which takes account of all relevant future incomes and expenditure over the period of analysis. NPV is an appropriate technique especially in situations where minimum WLC is sought.

The discount rate is one of the critical variables in WLC analysis; the decision to proceed with a project will be crucially affected by which discount rate is chosen. The discount rate selected for a WLC analysis has therefore a large effect on the final results. The discount rate has two functions:

- it enables future costs over a time horizon to be converted to their present value;
- by converting future costs which occur at both regular and irregular intervals to today's equivalent it is possible to directly compare different alternative design options.

The discount rate is generally taken to be the difference between the cost of borrowing (interest rate) and the rate of inflation.

The choice of interest rate depends on financial circumstances such as whether the client is financing the project through borrowed money or from capital assets, and on the objectives of the client. The higher the discount rate selected, the lower the present value of future costs. Using a high rate emphasises initial costs over future costs and income: it does not pay to introduce designs with lower operation and maintenance costs when the discount rate is high. These conditions impact heavily on the decision to invest in more durable materials and equipment. Using a discount rate that is too low, does just the opposite: the future costs and income will be exaggerated

1.2.2. Sensitivity analysis

WLC analysis is very sensitive to factors such as discount rate, project life (or period of analysis) and the lives of the various components used, together with their repair intervals and replacement cycles, unexpected use of the project, unusual events such as change of ownership, and the influences of future fiscal policies. Sensitivity analysis is required to be performed to help understand the uncertainty and risk associated with the selection of these factors

WLC Evaluator can compare a selection of alternatives can be compared by conducting a sensitivity analysis on the WLC data. After the options are selected, and the project files saved, reports can be generated to review the results of the calculations

1.2.3. Use of the tool

There are two principal modes in which the tool can be used.

- The calculation of whole life costs of the full, or part of an asset - in this mode the application breaks the cost down by both the item of work and also the phase within the project.
- The optioneering approach where trade-offs can be made between alternative types or part of construction.

1.3. Outcomes

Whole Life Cost Evaluator aligns with BS ISO 15686-5:2008 Buildings and Constructed Assets: Service Life Planning: Lifecycle Costing and also The Standardised Method of Life Cycle Costing (SMLCC) - the UK guidance to the standard which aligns elements for buildings to the BCIS Standard Form of Cost Analysis and enables buildings to be compared and to report the results to be reported in a consistent way.

The flexibility of the software allows the production of different levels of analysis, tailored to suit the user needs. Examples include:

- Evaluation with increased certainty of different investment scenarios of any new or existing asset at the investment planning stage, design and construction and post construction, especially in Public Private Partnership or Private Finance Initiative projects
- Producing a comparison of various options, which may be at the level of individual cost headings (e.g. energy costs, cleaning costs) or at a strategic level (e.g. open plan versus cellular office accommodation)
- Producing WLC analysis to meet the individual client requirements (e.g. Registered Social Landlords, Housing Associations, Local Authority or procurement guidance (eg Treasury Green Book)
- Producing 'what-if' scenarios to decide on the most economically advantageous solution over the life of the building
- Providing replacement schedules and budget costs for the facilities manager

This document is divided into the following sections:

- Part 2: User Interface
- Part 3: Getting Started with WLC Evaluator
- Part 4: Where to find help
- Part 5: Appendix A – WLC Evaluator Glossary of terms, abbreviations and definitions

PART 2: USER INTERFACE

Using WLC Evaluator is much like using any standard application. It is first important to notice common features like standard menu and tool bars and minimise and maximise buttons, but WLC Evaluator also uses common menu configurations and toolbars. Users should be computer literate and familiar with the windows application.

2.1. Installing WLC Evaluator

2.1.1. Operating system requirements

Different version of WLC Evaluator are available for both the PC and the MAC. Please ensure that you have the correct version

2.1.2. Installation

The WLC Evaluator free trial software can be downloaded from www.wlcsoftware.com/product.

Upon purchase of the software the full functionality will be enabled for the period of the licence with a USB dongle for use on a stand-alone computer. Once the free trial is complete you must have the USB dongle inserted to your computer to run the software.

2.2. Starting a new project

When Whole Life Cost Evaluator is started, a new blank document (unsaved project) appears on the screen as illustrated in Figure 2. This defaults to a structure based on ISO 15686-5. It is also possible to start new (blank) cost and work breakdown structures. Select File>New blank to access this.

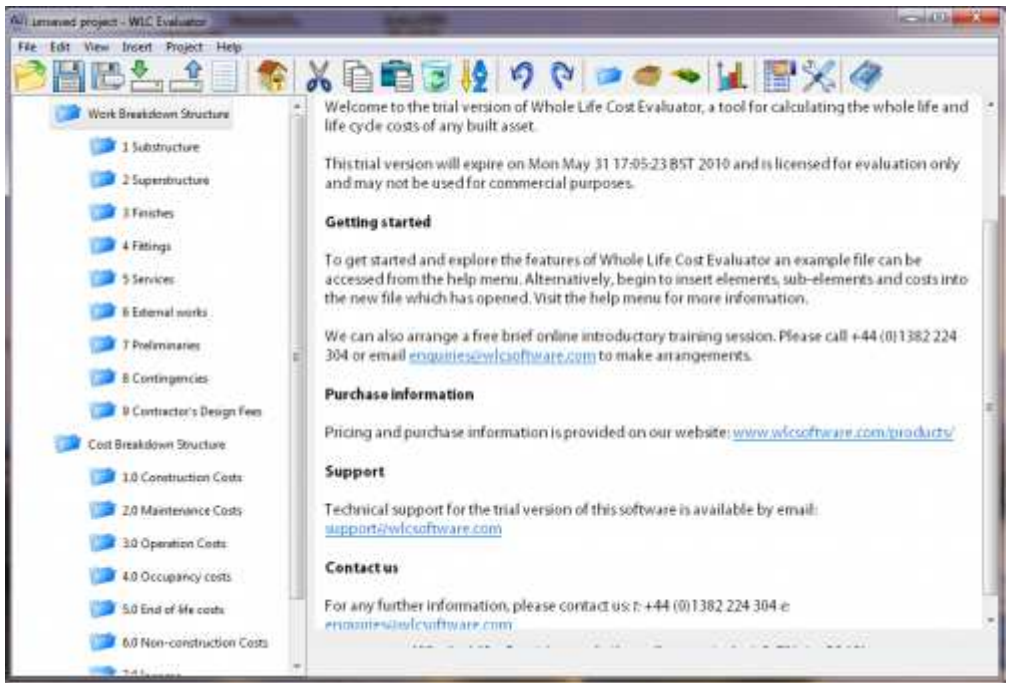

File Edit View Insert Project Help
Work Breakdown Structure
1 Substructure
2 Superstructure
3 Finishes
4 Fittings
5 Services
6 External works
7 Preliminaries
8 Contingencies
9 Contractor's Design Fees
Cost Breakdown Structure
1.0 Construction Costs
2.0 Maintenance Costs
3.0 Operation Costs
4.0 Occupancy costs
5.0 End of life costs
6.0 Non-construction Costs
Welcome to the trial version of Whole Life Cost Evaluator, a tool for calculating the whole life and life cycle costs of any built asset.
This trial version will expire on Mon May 31 17:05:23 BST 2010 and is licensed for evaluation only and may not be used for commercial purposes.
Getting started
To get started and explore the features of Whole Life Cost Evaluator an example file can be accessed from the help menu. Alternatively, begin to insert elements, sub-elements and costs into the new file which has opened. Visit the help menu for more information.
We can also arrange a free brief online introductory training session. Please call +44 (0)1382 224 304 or email enquiries@wlcsoftware.com to make arrangements.
Purchase information
Pricing and purchase information is provided on our website: www.wlcsoftware.com/products/
Support
Technical support for the trial version of this software is available by email: support@wlcsoftware.com
Contact us
For any further information, please contact us: t: +44 (0)1382 224 304 e:

Figure 2 - WLC Evaluator-The blank document (unsaved project)

When the file is saved for the first time, the unsaved project is replaced with the file name.

The main menu bar is to the top left of the screen and consists of menu options for File, Edit, View, Insert, Project and Help.

2.3. Menu & toolbar

Menu	Action	Description	Toolbar Icon
File	New	Creates a new project	n/a
	Open Recent	Allows selection of a project that has been opened recently	n/a
	Open	Allows a saved project file to be opened	
	Save	Used to save the current project	
	Save As	Used to save the current project for the first time, or to save the project under a new name	
	Save As Template	Used to save the project in its current state as a pre-populated project file	n/a
	Print	Used to print the current view	n/a
	Print Preview	Used to provide the user with a preview of what will be printed if the print function is used	n/a
	Import	Used to import a project in Microsoft Excel (or compatible) formats	
	Export	Used to export a project to a Microsoft Excel (and compatible) format	
	Reporting	Used to produce a report in the form of a 'cost plan' or 'cash flow' in a Microsoft Excel (and compatible) format	
	Close	Used to close the current project open in WLC Evaluator	n/a
	Exit	Used to close all open projects in WLC Evaluator	n/a
Edit	Undo	Used to undo the last action	
	Redo	Used to reverse the 'undo' function	
	Cut	Used to cut a copy of the selected entry to be placed elsewhere within the WBS or CBS, depending which section it has been cut from	
	Copy	Used to create a copy of the selected entry to be placed elsewhere within the WBS or CBS, depending which section it has been cut from	

Menu	Action	Description	Toolbar Icon
	Copy Graph/Table	Used to copy the current graph or table to be pasted elsewhere i.e. a word processing document	n/a
	Copy Project Information	Used to copy the project information to be pasted elsewhere i.e. a word processing document	n/a
	Copy Project Settings	Used to copy the project settings information to be pasted elsewhere i.e. a word processing document	n/a
	Paste	Used to paste an item that has been cut or copied	
	Delete	Used to delete a selected item	
	Sort	Used to sort data entries within the WBS or CBS	
	Reverse	Used to produce the reverse order of the current sort function	n/a
	Rename	Used to change the name of the selected entry in the WBS or CBS	n/a
	Assign cost types	Used to change the cost type of a selected entry in the CBS	n/a
View	No graph	Used to turn off the graph function	n/a
	Filled line graph	Produces a filled line graph	n/a
	Line graph	Produces a line graph	n/a
	Bar chart	Produces a bar chart	n/a
	Pie chart	Produces a pie chart	n/a
	Table of values	Produces a table of values	n/a
	Include all costs on graph	Allows all costs to be included in the graph function	n/a
	Cumulative	Changes figures in the graph to be either cumulative or non-cumulative	n/a
	Refresh.	Forces the graph to update following any changes to the data	n/a
Insert	Element	Used to insert a new element	n/a
	Sub-element	Used to insert a new sub-element	n/a
	Cost	Used to insert a cost for an element or sub-element	n/a
Project	Settings	Provides details of the current settings for the project that is open	
	Information	Provides the project information for the project that is open	n/a

Menu	Action	Description	Toolbar Icon
Help	Help	Used to access the help file for WLC Evaluator	
	About WLC Evaluator	Provides information about the installed version of WLC Evaluator	n/a

2.4. The work breakdown structure and cost breakdown structure

On the left-hand side, a work breakdown structure (WBS) and a cost breakdown structure (CBS) are shown for the project. The default structures are aligned with ISO 15686-5

In the WBS are elements and sub-elements. Sub-elements are the lowest group within the structure - therefore it is possible to have elements containing other elements and sub-elements. **Only sub-elements can contain costs.**

Costs can be inserted by selecting Insert>Cost and selecting the appropriate type of cost. When a cost is inserted into a sub-element on the work breakdown structure it is automatically reflected in the particular phase of the cost breakdown structure (e.g. construction). Therefore it is possible to see costs aggregated together by either element, or by phase.

It is possible to add costs to the cost breakdown structure but these will not be reflected in the work breakdown structure. This may be because, for example income, does not appear in the physical breakdown of costs.

Where a cost appears in the WBS and the CBS, changes to one will be reflected in the other.

If you are starting from a blank project, not based on ISO 15686-5 it is possible to define where costs for a particular phase are recorded. For more information please see section 3.6.

2.5. File management

Like standard windows applications, the WLC Evaluator project files are managed by using the File option on the main menu. The File option includes the ability to create new files, open existing files, save files, save files as different names and save a file as a template for future projects.

2.6. WLC Evaluator project files

Project Files in WLC Evaluator are the main storage areas for all data pertaining to analyses.

PART 3: HOW TO GET STARTED WITH WLC EVALUATOR

The following step-by-step outline describes how a WLC analysis is performed using WLC Evaluator.

3.1. Step 1 – Starting WLC Evaluator

The first step to performing a Whole Life Cost or Life Cycle Cost analysis is to start WLC Evaluator.

To start WLC Evaluator select WLC Evaluator from the Start Menu (This will give you a display as illustrated in Figure 3)

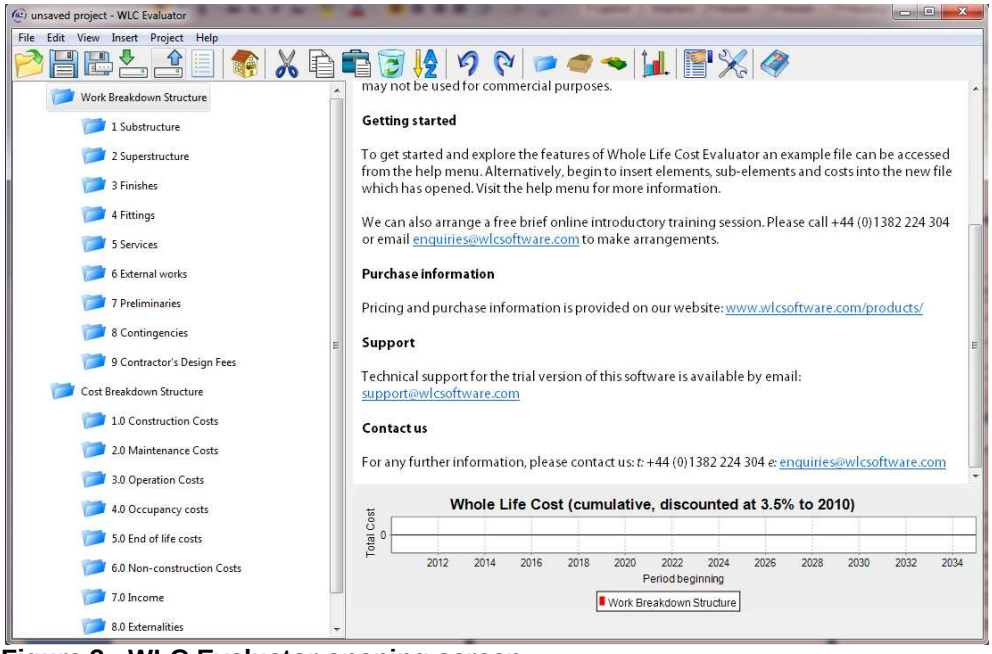

unsaved project - WLC Evaluator
File Edit View Insert Project Help
Work Breakdown Structure
1 Substructure
2 Superstructure
3 Finishes
4 Fittings
5 Services
6 External works
7 Preliminaries
8 Contingencies
9 Contractor's Design Fees
Cost Breakdown Structure
1.0 Construction Costs
2.0 Maintenance Costs
3.0 Operation Costs
4.0 Occupancy costs
5.0 End of life costs
6.0 Non-construction Costs
7.0 Income
8.0 Externalities
may not be used for commercial purposes.
Getting started
To get started and explore the features of Whole Life Cost Evaluator an example file can be accessed from the help menu. Alternatively, begin to insert elements, sub-elements and costs into the new file which has opened. Visit the help menu for more information.
We can also arrange a free brief online introductory training session. Please call +44 (0)1382 224 304 or email enquiries@wlcsoftware.com to make arrangements.
Purchase information
Pricing and purchase information is provided on our website: www.wlcsoftware.com/products/
Support
Technical support for the trial version of this software is available by email: support@wlcsoftware.com
Contact us
For any further information, please contact us: t: +44 (0)1382 224 304 e: enquiries@wlcsoftware.com
Whole Life Cost (cumulative, discounted at 3.5% to 2010)
Total Cost
0
2012 2014 2016 2018 2020 2022 2024 2026 2028 2030 2032 2034
Period beginning
Work Breakdown Structure

Figure 3 - WLC Evaluator opening screen

(Note this window may differ slightly due to your operating system)

3.2. Step 2 – Creating or opening a project file in WLC Evaluator

The second step to performing a whole life cost analysis is to create a WLC Evaluator project file. The default (unsaved file) which opens is aligned to BS ISO 15668-5.

To create a WLC Evaluator project file:

- Select **File** from the main menu, then from the drop down menu:
- Click **New** – for a new file

Opening a WLC Project File

To open a project file in WLC Evaluator:

- Click **File** from the main menu, then from the drop down menu:
- Click **Open** (for a previously saved version)

When the Open dialogue box appears select the document in the File name box and then choose the Open button, or simply double-click the name of the document.

To quickly open one of the last projects you worked on:

- Click **File** from the main menu, then from the drop down menu:
- Click **Open** Recent

Then double click the name of the project.

3.3. Step 3 - Setting the project information

All files in WLC Evaluator have properties associated with them. The properties or project information comprises the specific project details for your whole life cost analysis.

To input project information:

- Select **Project** from the main menu, then from the drop down menu
- Click **Information** to bring up the information window with the following input options:

Select one of the information options and insert text relating to the analysis. (This will give a display as illustrated in Figure 4). The opportunities to record data are below:

Information	Data stored
Software user information	User name, Position, Address
Client information	Organisation name, Organisation type, Organisation address, and Contact name.
Project information	Project name, Project type, Project phase, Location, Type of contract, Contract period and Project capacity.
Building information	Building type, Form of construction, Function of the building, Number of storeys, Gross internal floor area, Net floor area.
Site information	Site condition, Accessibility to the site.

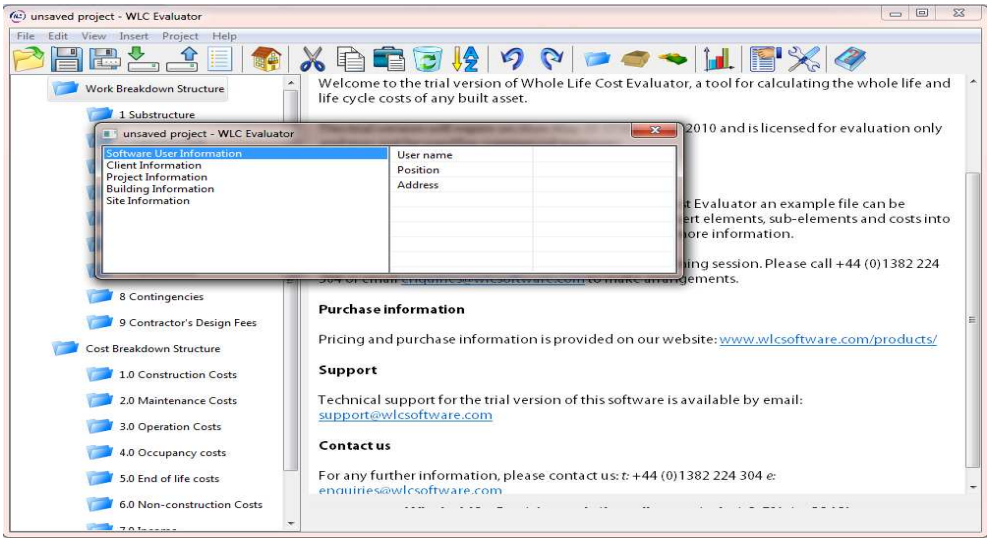

unsaved project - WLC Evaluator
File Edit View Insert Project Help
Work Breakdown Structure
1 Substructure
unsaved project - WLC Evaluator
Software User Information
Client Information
Project Information
Building Information
Site Information
User name
Position
Address
8 Contingencies
9 Contractor's Design Fees
Cost Breakdown Structure
1.0 Construction Costs
2.0 Maintenance Costs
3.0 Operation Costs
4.0 Occupancy costs
5.0 End of life costs
6.0 Non-construction Costs
Welcome to the trial version of Whole Life Cost Evaluator, a tool for calculating the whole life and life cycle costs of any built asset.
Purchase information
Pricing and purchase information is provided on our website: www.wlcsoftware.com/products/
Support
Technical support for the trial version of this software is available by email: support@wlcsoftware.com
Contact us
For any further information, please contact us: t: +44 (0)1382 224 304 e:

Figure 4 - Inputting project information

All the information input within the Project >Information window will be automatically included as an Executive Summary within your WLC Evaluator reporting option or can be copied and pasted into the chosen report /analysis style (see Section 3.9 Step 9 – Creating Reports).

3.4. Step 4 – Defining project settings

WLC Evaluator allows the user to define the project settings for determining the whole life cost analysis.

Project settings are accessed by:

- Selecting **Project** from the main menu, then from the drop down menu
- Click **Settings** to open the Project Settings window with the following input options:

Start date, Period of analysis (years), Interval, Discount rate (%), Base year of analysis, Cost multiplier (%) (as illustrated in Figure 5)

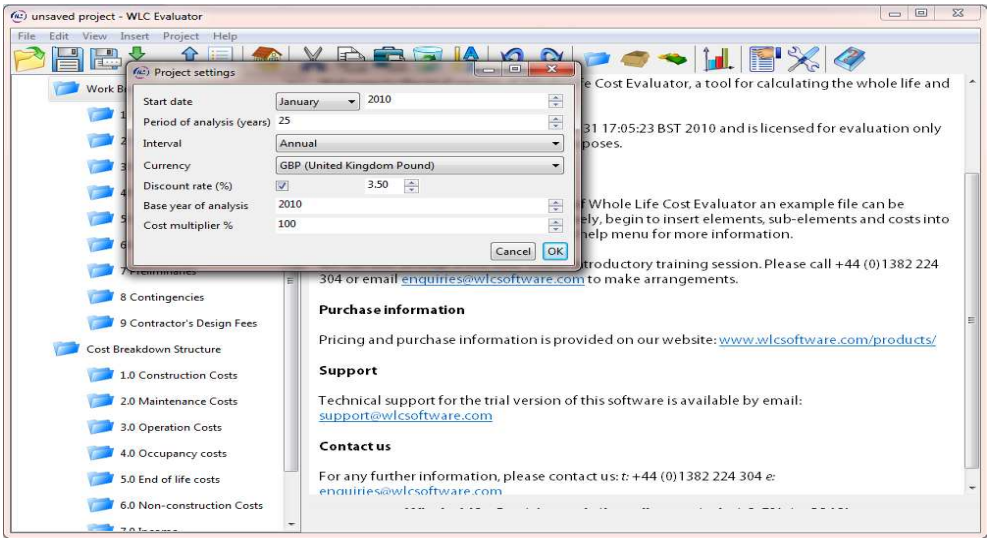


Figure 5 - Inputting project settings

Value	Purpose	Default	Units
Start date	The date for the start of the cost analysis which is recorded by month and year.	January 2010	Years
Period of analysis	The time period upon which the analysis is based which is recorded in years.	25	Years
Interval	significant stages during the analysis, which may be recorded as monthly, quarterly, bi-annual or annually	Annual	Time Intervals
Discount rate	The year upon which the WLC is carried out /analysed	3.5	Percent (%)
Base year	Used in determining the present value of future cash flows.	2010	Year
Cost multiplier	A percentage addition/subtraction which can be allocated to every cost within the analysis.	100	Percent (%)

3.5. Step 5 – Create the Work Breakdown Structure (WBS)

Once the project file has been created, the user should determine the structure of the elements in the analysis. First, create the Work Breakdown Structure (WBS) for the analysis.

The WBS is a hierarchical structure of the physical elements within a project. This is defined in the Work Breakdown Structure of WLC Evaluator.

Items within a WBS are added as either elements or sub elements. All elements reside at the topmost level of the WBS at the same indenture level. Sub-elements reside at the lowest level of indenture within the WBS.

The structure of the project may be built up by inserting elements or sub-elements. A default structure based on ISO 15686-5 is built into WLC Evaluator.

3.5.1. Adding elements and sub-elements to the WBS

To add an element to the WBS:

- Click on **Work Breakdown Structure**
- Click on **one of the elements**

The element will now be highlighted

- Select **Insert** from the main menu, then from the drop down menu click on **element** or **sub-element;**
- Click on the element button or sub-element button on the toolbar; or
- Right click on the element in the structure and select insert element or sub-element from the menu.

The **new element** will now be highlighted: this is to allow the user to enter a name, which is achieved by typing a name for this Element and striking the enter key (as illustrated in Figure 6 below)

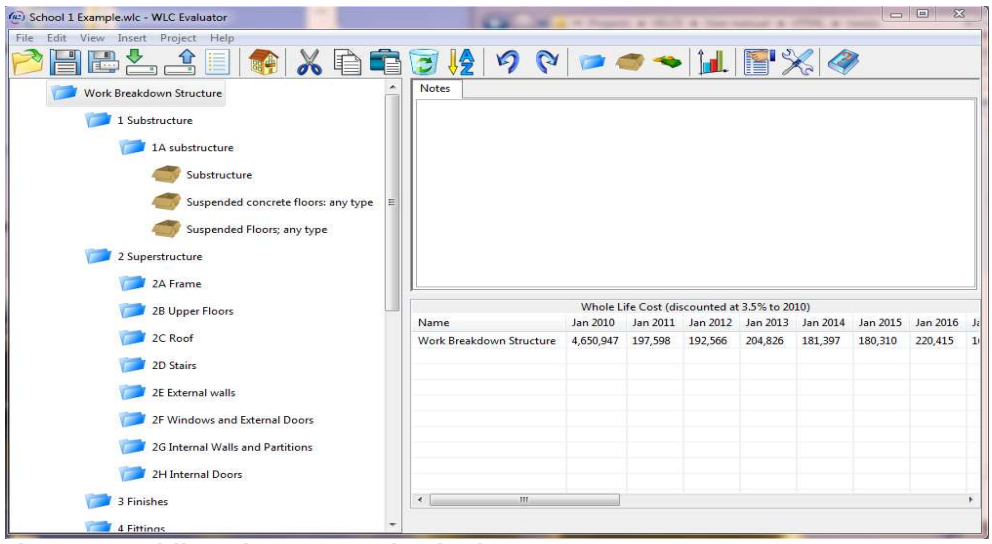

School 1 Example.wlc - WLC Evaluator
File Edit View Insert Project Help
Work Breakdown Structure
1 Substructure
1A substructure
Substructure
Suspended concrete floors: any type
Suspended Floors; any type
2 Superstructure
2A Frame
2B Upper Floors
2C Roof
2D Stairs
2E External walls
2F Windows and External Doors
2G Internal Walls and Partitions
2H Internal Doors
3 Finishes
4 Fittings
Notes
Whole Life Cost (discounted at 3.5% to 2010)
Name Jan 2010 Jan 2011 Jan 2012 Jan 2013 Jan 2014 Jan 2015 Jan 2016
Work Breakdown Structure 4,650,947 197,598 192,566 204,826 181,397 180,310 220,415

Figure 6 - Adding elements and sub-elements

3.5.2. Creating item data for an element or sub-element

When a new element or sub-element has been named the item data window opens (as illustrated in Figure 7 below) and details of the element can be inputted including the:

a) **Quantity or Amount** - the total quantity or amount of the element within the analysis. The total quantity or amount may be typed in or adjusted with use of the ∧ /∨ arrow keys.

b) **Unit of Measurement** – this may be selected from the drop down menu of mm, m, m², m³, number(nr), tonnes (t), item, prime cost sum (pc sum), provisional sum (prov sum), hours(h) or overwritten as another unit of measurement. These are pre-defined but users can specify any units they wish.

c) **Code** - this can be used as the user's own coding system, a BQ (Bill of Quantities) reference, NBS (National Building Specification) coding, or SMM7 (Standard Method of Measurement) reference coding.

d) **Description** – the software user may insert a description of the element (eg. materials specification, manufacturer name, etc.)

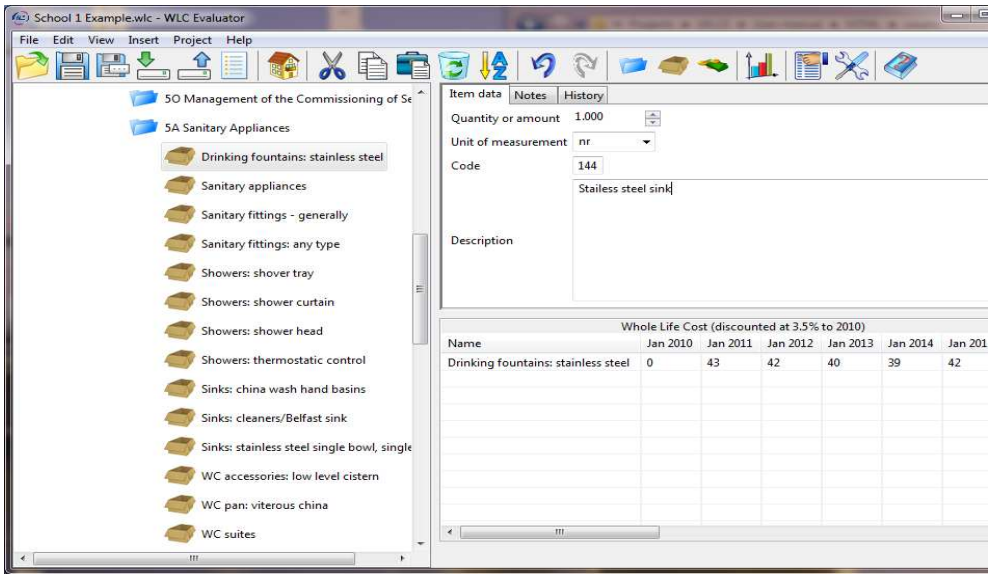

School 1 Example.wlc - WLC Evaluator
File Edit View Insert Project Help
5O Management of the Commissioning of Se
5A Sanitary Appliances
Drinking fountains: stainless steel
Sanitary appliances
Sanitary fittings - generally
Sanitary fittings: any type
Showers: shover tray
Showers: shower curtain
Showers: shower head
Showers: thermostatic control
Sinks: china wash hand basins
Sinks: cleaners/Belfast sink
Sinks: stainless steel single bowl, single
WC accessories: low level cistern
WC pan: viterous china
WC suites
Item data
Notes
History
Quantity or amount 1.000
Unit of measurement nr
Code 144
Stailess steel sink
Description
Whole Life Cost (discounted at 3.5% to 2010)
Name Jan 2010 Jan 2011 Jan 2012 Jan 2013 Jan 2014 Jan 201
Drinking fountains: stainless steel 0 43 42 40 39 42

Figure 7 - Creating item data for elements and sub-elements

The items in the WBS are displayed in a hierarchical format. The top level of the WBS is elements and all levels of indenture in the WBS are sub-elements that are shown as branches of these elements.

Any item in the WBS can be expanded or collapsed. When a branch is expanded, items beneath it are displayed and when a branch is collapsed, only that level is displayed.

Any portion of a WBS can be collapsed or expanded by double-clicking on the element - this will expand or collapse it. Single clicking on the arrow to the left of the element or sub-elements will perform the same action.

The WBS can then be built until every element is included within the hierarchical structure.

3.5.3. Moving elements or sub element within the WBS

Elements can be moved within the WBS by dragging and dropping. To do this, click and drag the selected element to reposition as required.

3.5.4. Deleting elements or sub-elements from the WBS

Elements and sub-elements in a WBS can be deleted.

- Select the element to be deleted then click edit>delete from the main menu; or
- Right click on an element or sub-element and select delete
- Select the item to be deleted and press the delete key on the keyboard.

3.5.5. Item data notes

The *notes* tab within the Item Data window allows the user to input notes relating to the sub element.

3.5.6. Item data history

The history tab within the Item Data window allows the user to view a log of all the user inputs relating to the sub-element. The history tab records the time and date of

the user input, user identification, the item name along with the old and new changes. The associated memo field allows the user to annotate against each change made. (as illustrated in Figure 8 below). This creates an audit trail of all the changes which have been made to the project.

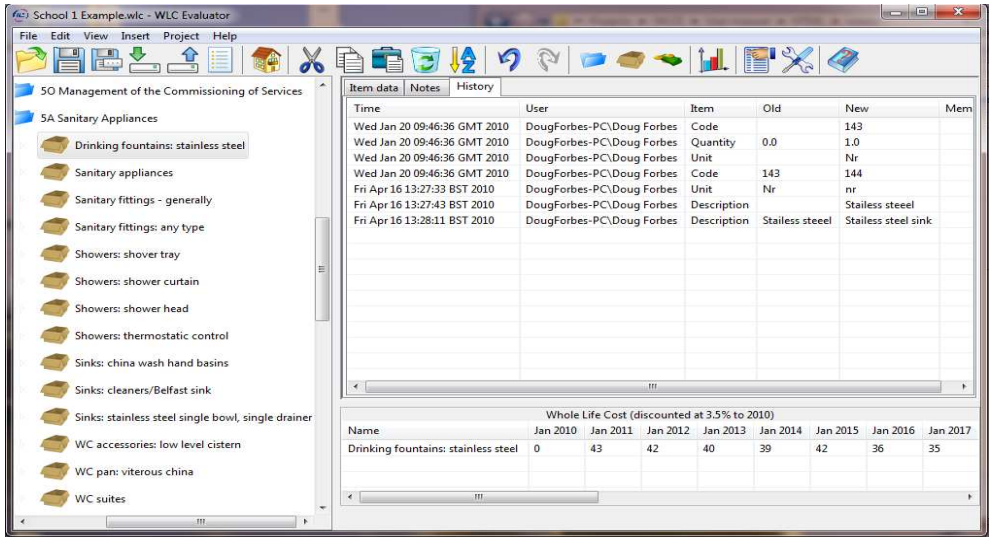

School 1 Example.wlc - WLC Evaluator
File Edit View Insert Project Help
50 Management of the Commissioning of Services
5A Sanitary Appliances
Drinking fountains: stainless steel
Sanitary appliances
Sanitary fittings - generally
Sanitary fittings: any type
Showers: shover tray
Showers: shower curtain
Showers: shower head
Showers: thermostatic control
Sinks: china wash hand basins
Sinks: cleaners/Belfast sink
Sinks: stainless steel single bowl, single drainer
WC accessories: low level cistern
WC pan: viterous china
WC suites
Item data Notes History
Time User Item Old New Mem
Wed Jan 20 09:46:36 GMT 2010 DougForbes-PC\Doug Forbes Code 143
Wed Jan 20 09:46:36 GMT 2010 DougForbes-PC\Doug Forbes Quantity 0.0 1.0
Wed Jan 20 09:46:36 GMT 2010 DougForbes-PC\Doug Forbes Unit Nr
Wed Jan 20 09:46:36 GMT 2010 DougForbes-PC\Doug Forbes Code 143 144
Fri Apr 16 13:27:33 BST 2010 DougForbes-PC\Doug Forbes Unit Nr nr
Fri Apr 16 13:27:43 BST 2010 DougForbes-PC\Doug Forbes Description Stailess steeel
Fri Apr 16 13:28:11 BST 2010 DougForbes-PC\Doug Forbes Description Stailess steeel Stailess steel sink
Whole Life Cost (discounted at 3.5% to 2010)
Name Jan 2010 Jan 2011 Jan 2012 Jan 2013 Jan 2014 Jan 2015 Jan 2016 Jan 2017
Drinking fountains: stainless steel 0 43 42 40 39 42 36 35

Figure 8 - Item data history

3.6. Step 6 – Creating the cost breakdown structure

Once the Work Breakdown Structure for the project has been created, the user should determine all the associated costs of the elements within the analysis.

The Cost Breakdown Structure (CBS) is broken down into various cost categories to which costs can be applied. If you have used the ISO 15686-5 file, the default is taken from the BCIS Supplement to ISO 15686-5 - the Standard Method of Measurement for Life Cycle Costing.

It is however possible to adapt this structure to meet your own needs, or to develop a new structure. To insert a new cost into the Cost Breakdown Structure:

- Click on **Cost Breakdown Structure,** or one element within the Cost Breakdown Structure
- Select **Insert** from the main menu, then from the drop down menu
- Click on **Cost**
- Select the drop down menu for Cost and the following life cycle cost categories appear (as illustrated in Figure 9 below):

  Construction

  Maintenance

  Operation

  Occupancy

  End of life

  Non-construction

  Income

  Externalities

  Other

Costs are also broken down to further levels. These are based on the ISO 15686 supplement, but can be modified to suit individual user's needs.

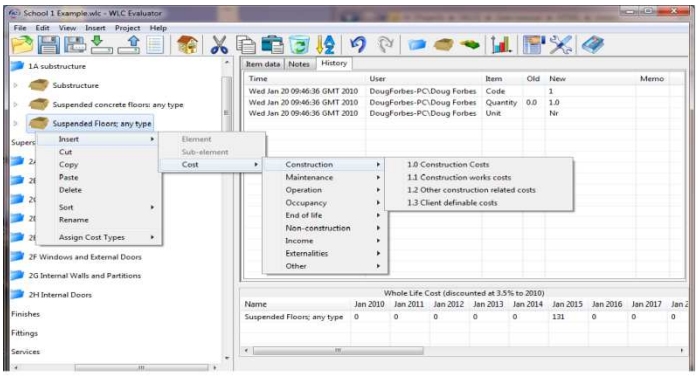


Figure 9 - The life-cycle cost categories

The **new cost** will now be highlighted; this is to allow the user to enter a task name for the new cost*.

- Type a name for this cost and hit the enter key. This will give a display as illustrated in Figure 10

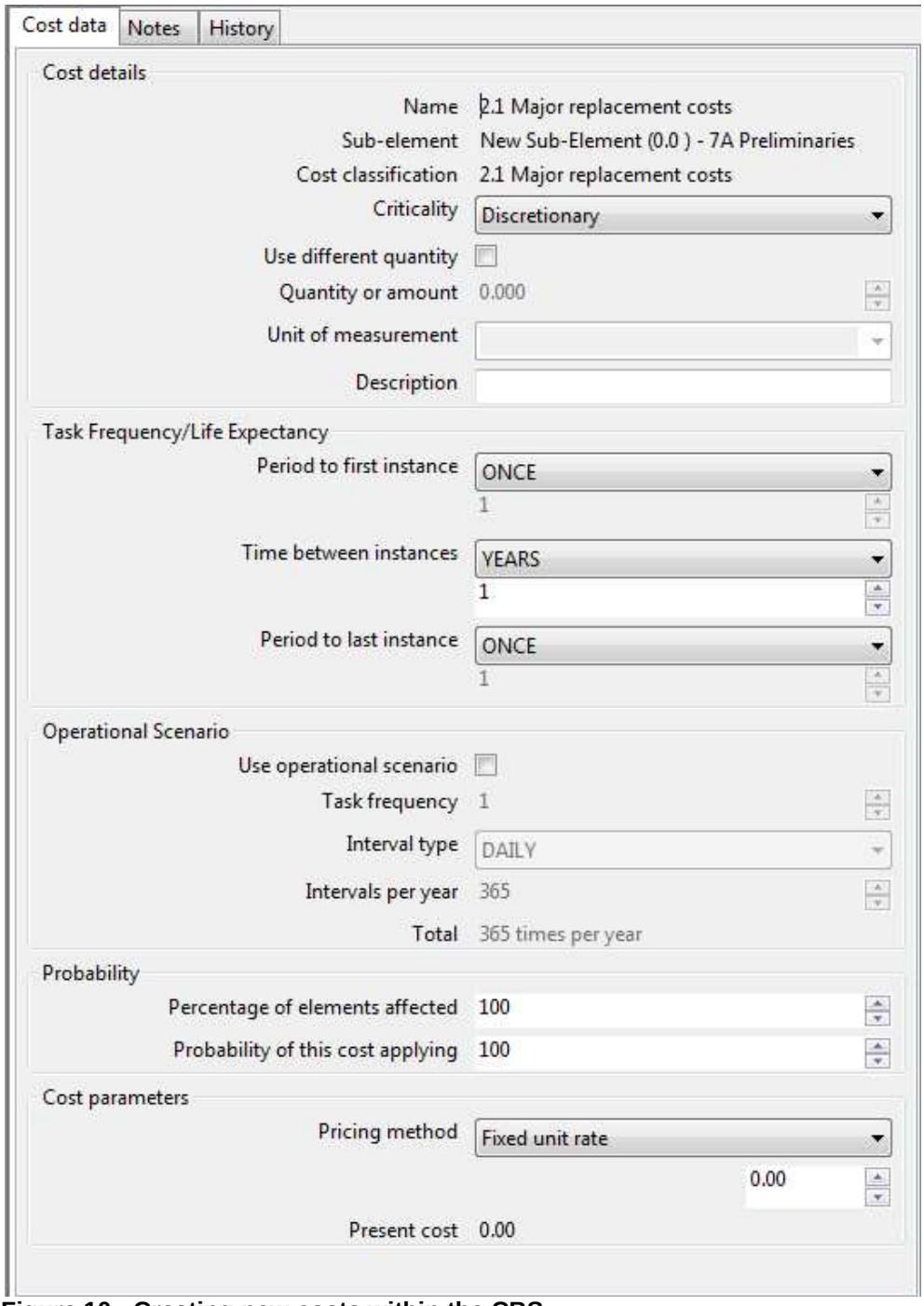


Figure 10 - Creating new costs within the CBS

Selecting one of the life cycle cost categories opens the Cost Data window and enables the user to assign costs associated with your life cycle cost category.

Certain sections will be disabled which do not require information to be input for this particular cost type (eg no operational scenarios for construction costs).

The items in the CBS are displayed in a hierarchical format. The top level of the CBS is displayed as the WLC category and all levels of indenture in the CBS are shown as branches of the main item.

Any item in the CBS can be expanded or collapsed. When a branch is expanded, items beneath it are displayed. When a branch is collapsed, only that level is displayed.

Any portion of a CBS can be expanded or collapsed by double-clicking on the desired element or selecting the arrow to the left of the element.

It is also possible to user-define where costs are stored from the work breakdown structure. For more information, please see section 3.10.8.

3.7. Step 7 – Assigning costs

WLC Evaluator allows cost data to be assigned to establish pricing methods for each task within the analysis.

To input cost data:

In the Cost Data window any life cycle cost data the user is required to input for the selected task is automatically enabled to allow the user to input the associated data.

The fields activated within the cost data window are dependent on the life cycle cost category selected.

If a different life cycle cost category were selected then different data fields within the cost data window would be enabled to allow the user to input the associated data (as illustrated in Figure 12 and Figure 13).

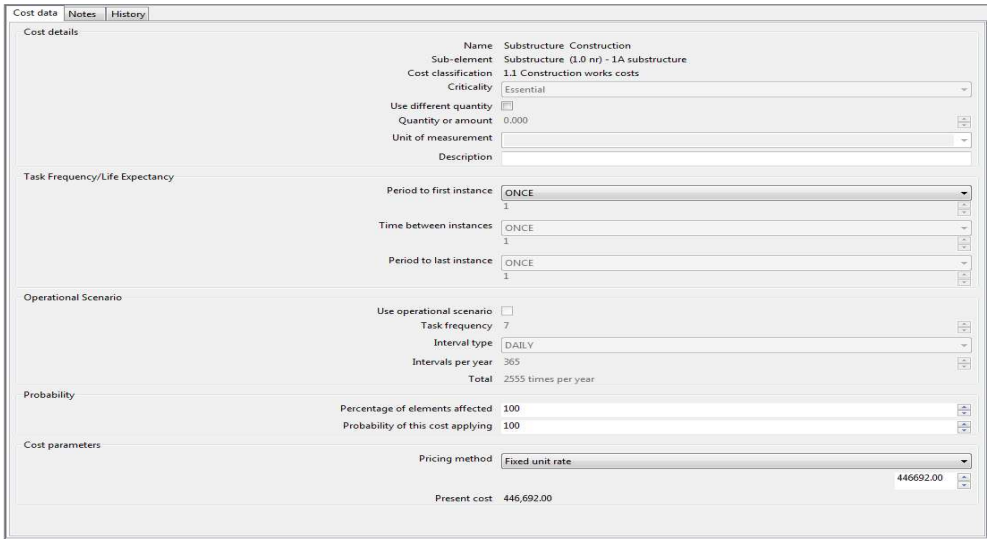


Figure 11 - Inputting construction costs

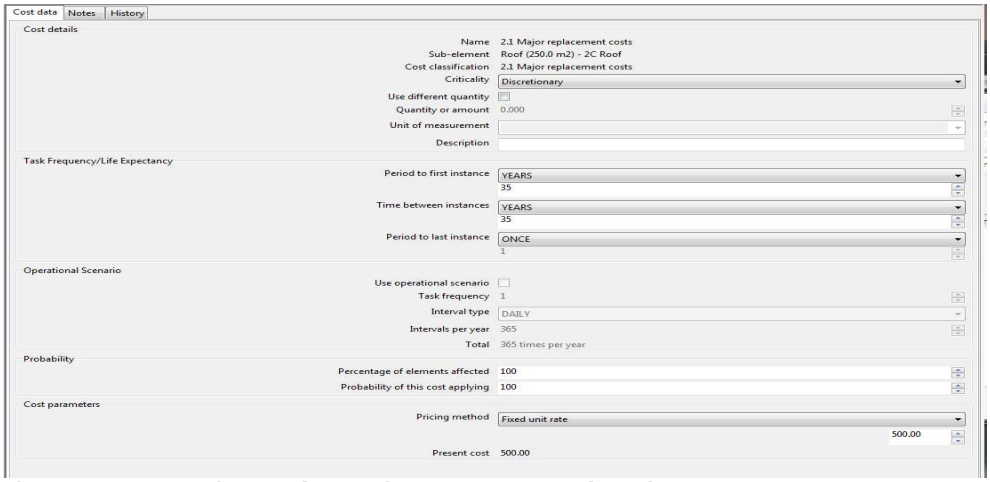


Figure 12 - Inputting major replacement costs (LCR)

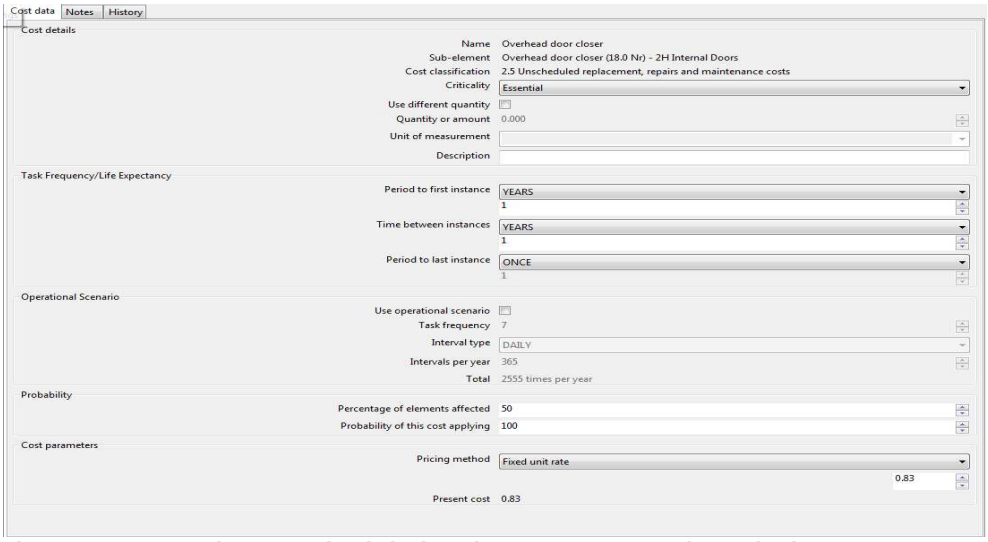


Figure 13 - Inputting unscheduled maintenance costs (reactive)

Table 1 illustrates and lists all the information required for calculating the cost options that are available within the Cost Data window.

Table 1 – Assigning costs – required data

Section	Field	Input required
Cost details The cost details include the task name, the element to which the task is related and its criticality status	Task name	No user input required. This is automatically taken from the name given in the WBS.
	Sub-element	No user input required.
	Criticality (When selected the cost details for the task regarding Criticality can be selected from the dropdown menu)	Insert the criticality status from the dropdown menu. Statutory – a legal requirement, Essential – not a legal requirement but essential for operational efficiency,. Discretionary-not statutory or essential but advisable This lets the user define the criticality of different tasks and therefore make adjustments based on the criticality.
Task frequency/Life expectancy Defines what time intervals should be specified for the task. Task Frequency- the number of times the task must be administered Life expectancy- is the average number of years of life remaining at a given age.	Period to first instance	Insert the time period until the first task is carried out. This may be selected from the dropdown menu (e.g. once, days, weeks, months, years)
	Time between instances	Insert the time period between the tasks. This may be selected from the dropdown menu (e.g. once, days, weeks, months, years)
	Period to last instance	Insert the overall time period over which this task applies. This may be selected from the dropdown menu (e.g. once, days, weeks, months, years)
Operational Scenario This relates to the use of the building or project.	Use operational scenario (tick box) When selected Operational Scenario is enabled	If operational scenario is selected then the frequency of the operation can be specified
	Tasks frequency	Insert the number of times your task will occur in a period of time
	Intervals per year	Insert the number of intervals per year required
	Total	No user input required. The total amount of times per

		year your task will occur.
Probability Estimate the percentage of elements affected e.g. scheduled replacement of light fittings	Percentage of elements affected	Input the percentage of elements affected by this task
	Probability of this cost applying	Input the percentage of likelihood or chance of this task happening
Cost This is the cost of the item	Pricing method Contains various pricing methods to calculate the cost of a task that can be selected from a drop down menu	Input the pricing method used for the task by selecting it from the dropdown menu. i) Custom Equation (see section 3.10.3) ii) Percentage of construction cost iii) Labour/Plant/Materials iv) Fixed unit rate – a value which is per unit of measurement
	Present cost	The cost of the task based on the total cost for the task. No user input required.

3.7.1. Cost data notes

The notes tab within the Cost Data window allows the user to input notes relating to the cost data of their task. For example, this may be the source of the cost data. This is illustrated in Figure 14.

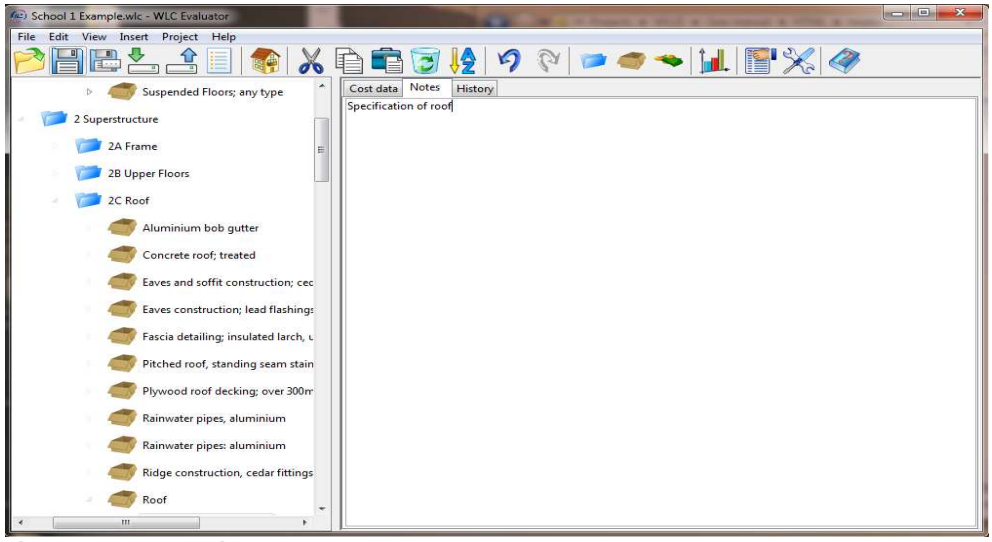


Figure 14 - Cost data notes

3.7.2. Cost data history

The history tab within the Cost Data window allows the user to view a log of all the user inputs relating to the cost data of a task. The history tab records the time and date of the user input, user identification, the item name, and both the old and new

changes. The associated memo column allows the user to annotate against each change made. This is illustrated in Figure 15 for plaster cladding to walls.

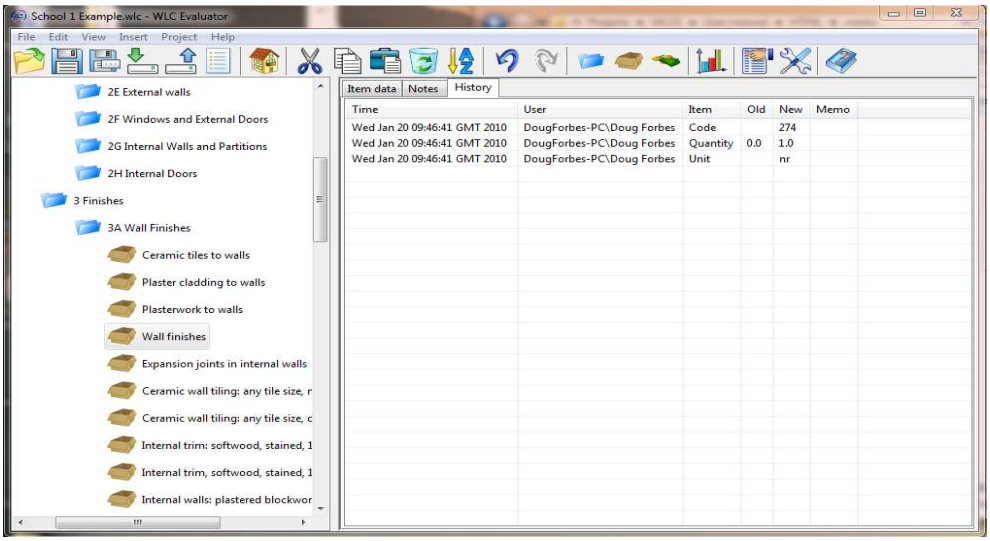


Figure 15 - Cost data history

3.8. Step 8 – Viewing the cost analysis

After costs have been input, WLC Evaluator performs calculations based on the costs that were assigned to each task in the CBS, and the total cost is the sum of all the lower level calculations. The WLC Evaluator default for viewing options is set not to show graphs.

Altering the calculations can be illustrated directly and represented in different viewing formats or charts: No graph, Filled line graph, Line graph, Bar graph, Pie chart, Table of values, Include all costs on graph, Cumulative.

To access the viewing options:

- Select **View** from the main menu, then from the drop down menu or the toolbar button
- Click on the required viewing option or chart

This will give a display as illustrated in Figure 16.

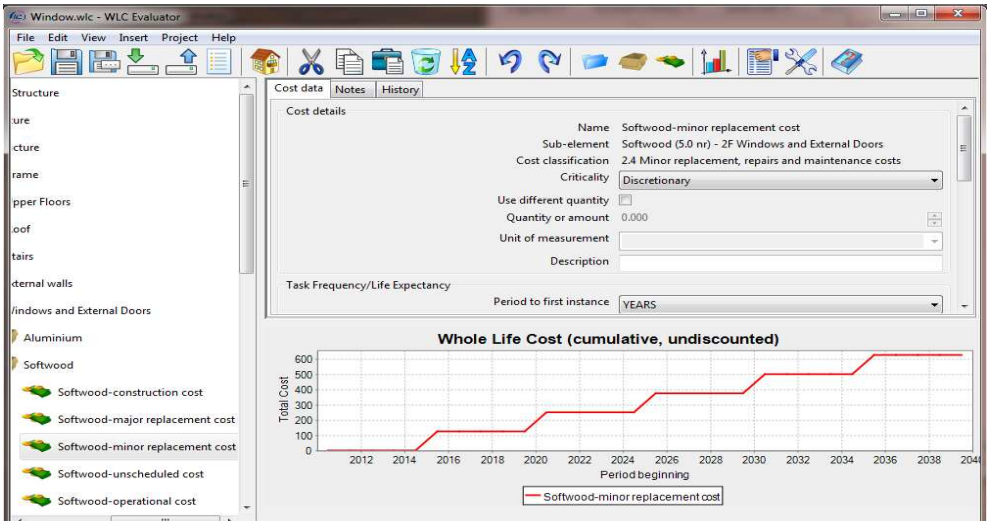


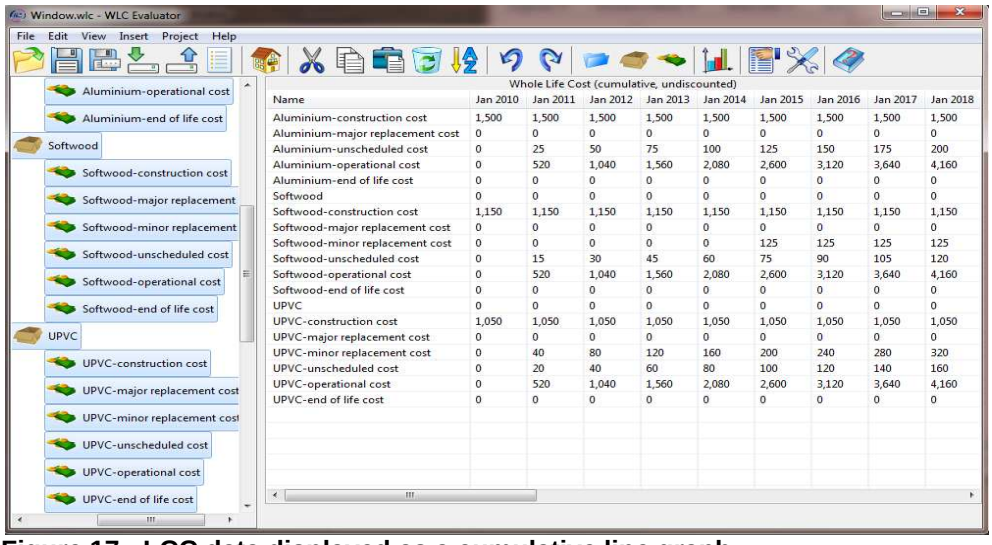
Figure 16 - Softwood windows minor replacement cost displayed as a line graph

The **Cost Data** window will appear at the top of the screen with the selected viewing option at the bottom of the screen.

By holding down the control key and clicking on the new item simultaneously, the graph will fill the whole screen.

Alternatively, clicking and dragging the frame around the graph will enlarge the display.

Comparisons of the different types of costs associated with your cost analysis can be displayed by holding down the control key and clicking on the costs to be compared. The costs associated with elements can be displayed in various different formats (some examples of these are illustrated in Figure 17, Figure 18 and Figure 19)



Name	Jan 2010	Jan 2011	Jan 2012	Jan 2013	Jan 2014	Jan 2015	Jan 2016	Jan 2017	Jan 2018
Aluminium-construction cost	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Aluminium-major replacement cost	0	0	0	0	0	0	0	0	0
Aluminium-unscheduled cost	0	25	50	75	100	125	150	175	200
Aluminium-operational cost	0	520	1,040	1,560	2,080	2,600	3,120	3,640	4,160
Aluminium-end of life cost	0	0	0	0	0	0	0	0	0
Softwood	0	0	0	0	0	0	0	0	0
Softwood-construction cost	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150
Softwood-major replacement cost	0	0	0	0	0	0	0	0	0
Softwood-minor replacement cost	0	0	0	0	0	125	125	125	125
Softwood-unscheduled cost	0	15	30	45	60	75	90	105	120
Softwood-operational cost	0	520	1,040	1,560	2,080	2,600	3,120	3,640	4,160
Softwood-end of life cost	0	0	0	0	0	0	0	0	0
UPVC	0	0	0	0	0	0	0	0	0
UPVC-construction cost	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
UPVC-major replacement cost	0	0	0	0	0	0	0	0	0
UPVC-minor replacement cost	0	40	80	120	160	200	240	280	320
UPVC-unscheduled cost	0	20	40	60	80	100	120	140	160
UPVC-operational cost	0	520	1,040	1,560	2,080	2,600	3,120	3,640	4,160
UPVC-end of life cost	0	0	0	0	0	0	0	0	0

Figure 17 - LCC data displayed as a cumulative line graph

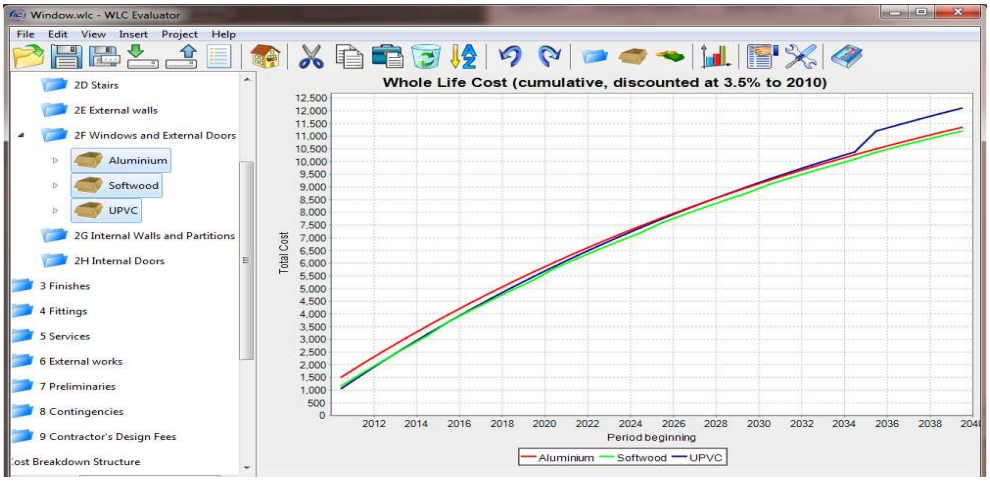


Figure 18 - WLC data displayed as a pie chart

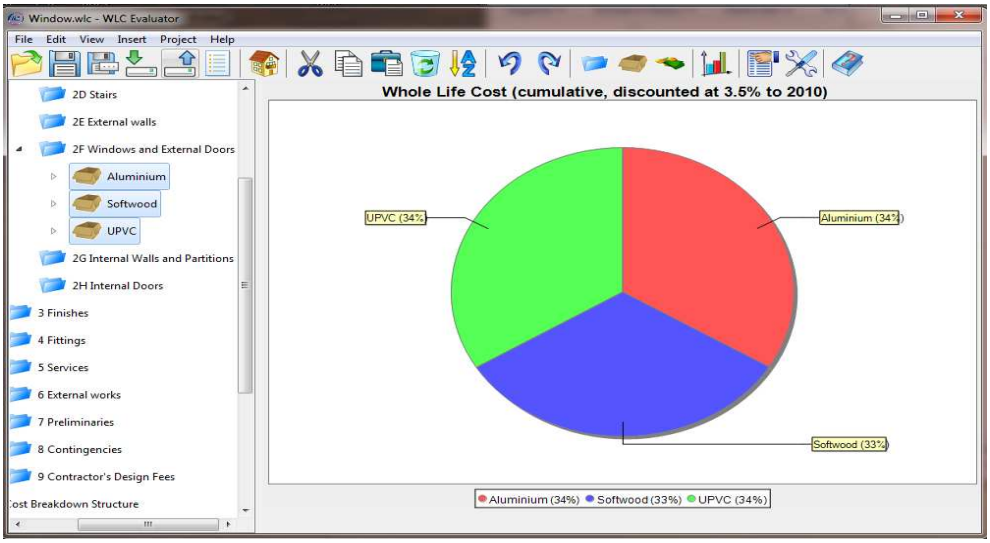


Figure 19 - WLC data displayed as a table of values

3.8.1. Include all costs on graph

Include all costs on graph – allows the user to view and compare multiple costs on the same graph i.e. multiple element costs, multiple life cycle cost categories, multiple project phases.

3.8.2. Cumulative view

The cumulative graph illustrates the sum of all the costs to a particular point in time.

3.9. Step 9 – Creating reports

All of the project information and cost data, which have been included in the LCC or WLC project file can be used to create a customisable spreadsheet report or used to create the report in the user's chosen software application.

3.9.1. Create a report in Excel

To create a report in Excel:

- Click **File** from the main menu, then from the drop down menu
- Select **Reporting**, and then in the report settings window

- Select the report type required (this may be as a Cash flow or Cost plan as illustrated in Figure 20 below) and click **OK**

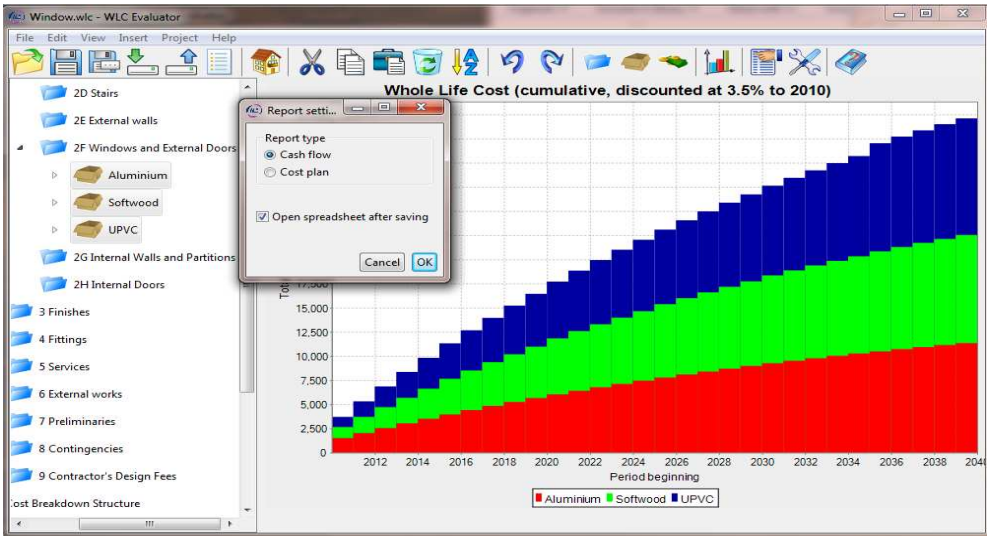


Figure 20 - Reporting options

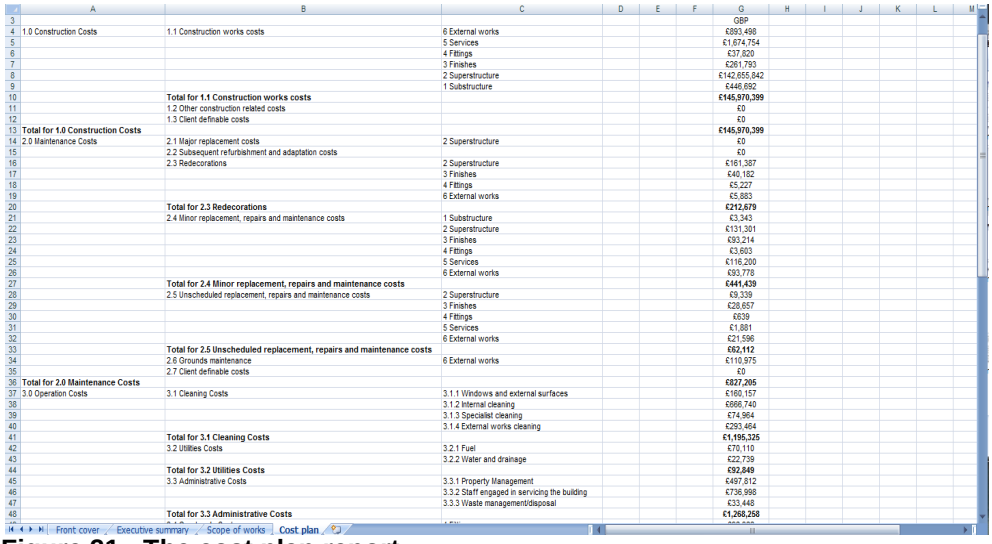
The Excel report comprises four sheets, i) Front cover, ii) Executive summary, iii) Scope of works and iv) either the cash flow or cost plan (as selected from the report settings window).

The front cover displays the project name as the title of the report, the location of the project and the software user, position and address.

The executive summary contains all the project Information inputted within the WLC Evaluator project files e.g. software user information, client information, project information, building information, site information, and the project settings.

The scope of works provides prompts for the user to input information regarding the scope of the works e.g. objectives, assumptions, materials, constraints, alternatives and interpretation of the results.

The cost plan illustrates the total WLC of the analysis per unit (the unit could be per m² or per functional unit, as illustrated in Figure 21.

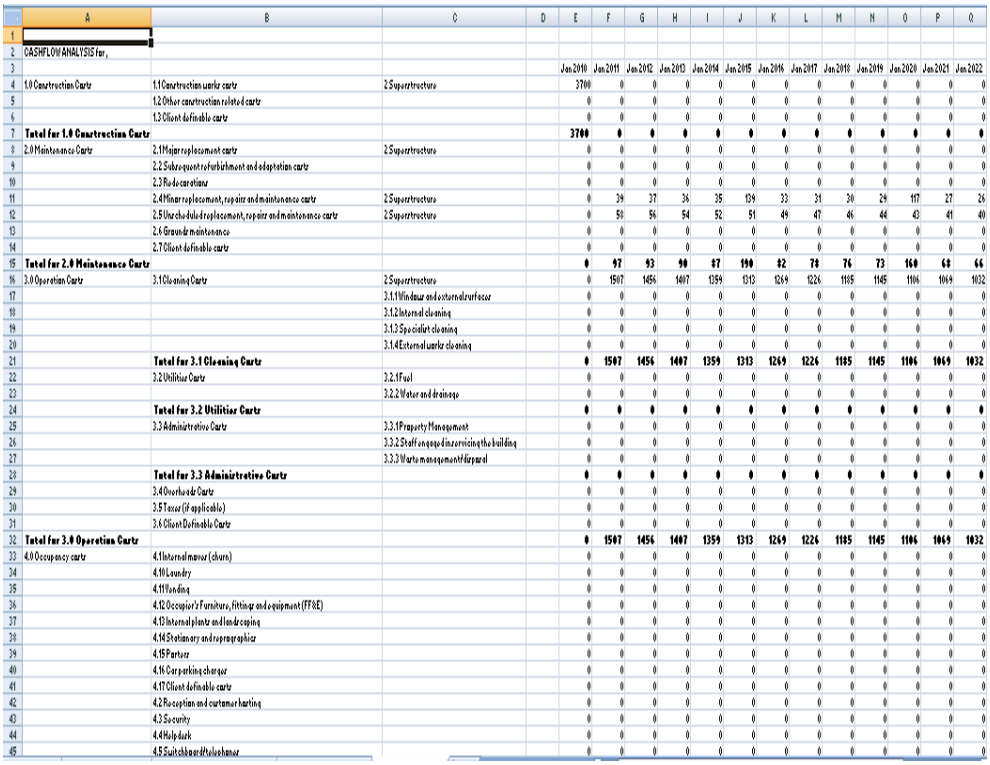


	A	B	C	G
3				GBP
4	1.0 Construction Costs	1.1 Construction works costs	6 External works	£893,498
5			5 Services	£1,674,754
6			4 Fittings	£37,820
7			3 Finishes	£261,793
8			2 Superstructure	£142,655,842
9			1 Substructure	£446,692
10		**Total for 1.1 Construction works costs**		**£145,970,399**
11		1.2 Other construction related costs		£0
12		1.3 Client definable costs		£0
13	**Total for 1.0 Construction Costs**			**£145,970,399**
14	2.0 Maintenance Costs	2.1 Major replacement costs	2 Superstructure	£0
15		2.2 Subsequent refurbishment and adaptation costs		£0
16		2.3 Redecorations	2 Superstructure	£161,387
17			3 Finishes	£48,182
18			4 Fittings	£5,227
19			6 External works	£5,883
20		**Total for 2.3 Redecorations**		**£212,679**
21		2.4 Minor replacement, repairs and maintenance costs	1 Substructure	£3,343
22			2 Superstructure	£131,301
23			3 Finishes	£93,214
24			4 Fittings	£3,603
25			5 Services	£116,200
26			6 External works	£93,778
27		**Total for 2.4 Minor replacement, repairs and maintenance costs**		**£441,439**
28		2.5 Unscheduled replacement, repairs and maintenance costs	2 Superstructure	£9,339
29			3 Finishes	£28,657
30			4 Fittings	£839
31			5 Services	£1,881
32			6 External works	£21,596
33		**Total for 2.5 Unscheduled replacement, repairs and maintenance costs**		**£62,112**
34		2.6 Grounds maintenance	6 External works	£110,975
35		2.7 Client definable costs		£0
36	**Total for 2.0 Maintenance Costs**			**£827,205**
37	3.0 Operation Costs	3.1 Cleaning Costs	3.1.1 Windows and external surfaces	£160,157
38			3.1.2 Internal cleaning	£666,740
39			3.1.3 Specialist cleaning	£74,964
40			3.1.4 External works cleaning	£293,464
41		**Total for 3.1 Cleaning Costs**		**£1,195,325**
42		3.2 Utilities Costs	3.2.1 Fuel	£70,110
43			3.2.2 Water and drainage	£22,739
44		**Total for 3.2 Utilities Costs**		**£92,849**
45		3.3 Administrative Costs	3.3.1 Property Management	£497,812
46			3.3.2 Staff engaged in servicing the building	£736,998
47			3.3.3 Waste management/disposal	£33,448
48		**Total for 3.3 Administrative Costs**		**£1,268,258**

Front cover | Executive summary | Scope of works | Cost plan

Figure 21 - The cost plan report

The cash flow report illustrates the total expenditure of all costs per year in a table of results as illustrated in Figure 22.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																	
2	CASHFLOW ANALYSIS for,																
3					Jan 2010	Jan 2011	Jan 2012	Jan 2013	Jan 2014	Jan 2015	Jan 2016	Jan 2017	Jan 2018	Jan 2019	Jan 2020	Jan 2021	Jan 2022
4	1.0 Construction Costs	1.1 Construction works costs	2 Superstructure		3700	0	0	0	0	0	0	0	0	0	0	0	0
5		1.2 Other construction related costs			0	0	0	0	0	0	0	0	0	0	0	0	0
6		1.3 Client definable costs			0	0	0	0	0	0	0	0	0	0	0	0	0
7	**Total for 1.0 Construction Costs**				**3700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8	2.0 Maintenance Costs	2.1 Major replacement costs	2 Superstructure		0	0	0	0	0	0	0	0	0	0	0	0	0
9		2.2 Subsequent refurbishment and adaptation costs			0	0	0	0	0	0	0	0	0	0	0	0	0
10		2.3 Redecorations			0	0	0	0	0	0	0	0	0	0	0	0	0
11		2.4 Minor replacement, repairs and maintenance costs	2 Superstructure		0	29	37	36	35	129	33	31	30	29	117	27	26
12		2.5 Unscheduled replacement, repairs and maintenance costs	2 Superstructure		0	59	56	54	52	51	49	47	46	44	43	41	40
13		2.6 Grounds maintenance			0	0	0	0	0	0	0	0	0	0	0	0	0
14		2.7 Client definable costs			0	0	0	0	0	0	0	0	0	0	0	0	0
15	**Total for 2.0 Maintenance Costs**				**0**	**97**	**93**	**90**	**87**	**180**	**82**	**78**	**76**	**73**	**160**	**68**	**66**
16	3.0 Operation Costs	3.1 Cleaning Costs	2 Superstructure		0	1507	1456	1407	1359	1313	1269	1226	1185	1145	1106	1069	1032
17			3.1.1 Window and external surfaces		0	0	0	0	0	0	0	0	0	0	0	0	0
18			3.1.2 Internal cleaning		0	0	0	0	0	0	0	0	0	0	0	0	0
19			3.1.3 Specialist cleaning		0	0	0	0	0	0	0	0	0	0	0	0	0
20			3.1.4 External works cleaning		0	0	0	0	0	0	0	0	0	0	0	0	0
21		**Total for 3.1 Cleaning Costs**			**0**	**1507**	**1456**	**1407**	**1359**	**1313**	**1269**	**1226**	**1185**	**1145**	**1106**	**1069**	**1032**
22		3.2 Utilities Costs	3.2.1 Fuel		0	0	0	0	0	0	0	0	0	0	0	0	0
23			3.2.2 Water and drainage		0	0	0	0	0	0	0	0	0	0	0	0	0
24		**Total for 3.2 Utilities Costs**			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
25		3.3 Administrative Costs	3.3.1 Property Management		0	0	0	0	0	0	0	0	0	0	0	0	0
26			3.3.2 Staff engaged in servicing the building		0	0	0	0	0	0	0	0	0	0	0	0	0
27			3.3.3 Waste management disposal		0	0	0	0	0	0	0	0	0	0	0	0	0
28		**Total for 3.3 Administrative Costs**			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
29		3.4 Overheads Costs			0	0	0	0	0	0	0	0	0	0	0	0	0
30		3.5 Taxes (if applicable)			0	0	0	0	0	0	0	0	0	0	0	0	0
31		3.6 Client Definable Costs			0	0	0	0	0	0	0	0	0	0	0	0	0
32	**Total for 3.0 Operation Costs**				**0**	**1507**	**1456**	**1407**	**1359**	**1313**	**1269**	**1226**	**1185**	**1145**	**1106**	**1069**	**1032**
33	4.0 Occupancy costs	4.1 Internal moves (churn)			0	0	0	0	0	0	0	0	0	0	0	0	0
34		4.10 Laundry			0	0	0	0	0	0	0	0	0	0	0	0	0
35		4.11 Vending			0	0	0	0	0	0	0	0	0	0	0	0	0
36		4.12 Occupier's Furniture, fittings and equipment (FF&E)			0	0	0	0	0	0	0	0	0	0	0	0	0
37		4.13 Internal plants and landscaping			0	0	0	0	0	0	0	0	0	0	0	0	0
38		4.14 Stationary and reprographics			0	0	0	0	0	0	0	0	0	0	0	0	0
39		4.15 Parties			0	0	0	0	0	0	0	0	0	0	0	0	0
40		4.16 Car parking charges			0	0	0	0	0	0	0	0	0	0	0	0	0
41		4.17 Client definable costs			0	0	0	0	0	0	0	0	0	0	0	0	0
42		4.2 Reception and customer hosting			0	0	0	0	0	0	0	0	0	0	0	0	0
43		4.3 Security			0	0	0	0	0	0	0	0	0	0	0	0	0
44		4.4 Help desk			0	0	0	0	0	0	0	0	0	0	0	0	0
45		4.5 Switchboard/telephones			0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 22 - The cash flow report

The report can then be customised to suit the client's requirements by adding charts or graphs, additional text, company logos etc.

3.9.2. Copying and pasting project information

All of the other information held within the analysis e.g. Project Information, Project settings and graphical representations, charts or tables displaying the costs within the analysis may be copied and pasted into your chosen report format and edited to suit the user's individual report style.

To copy and paste the Project Information or Project Settings data:

- Click **Edit** from the main menu, then from the drop down menu
- Select **Copy Project Information** or **Copy Project Settings**

The selection can then be pasted into the chosen software application. The Project Information or Project Settings data will then be pasted within your report to edit as required.

To copy and paste your graphical representations:

- Select **View** from the main menu, then from the drop down menu
- Click on the required viewing option e.g. No graph, Filled line graph, Line graph, Bar graph, Pie chart, Table of values, Include all costs on graph or Cumulative to display the data graphically.

When the viewing option is displayed:

- Select **Edit**, then from the dropdown menu
- Click **Copy Graph/Table**, then paste into the report.

Alternatively, the viewing option can be right clicked and:

- Select **Save as** and enter the file name for the graph
- Click **Save** (Clicking save, saves the graph as a *.png file)

The *.png file can then be opened, and saved within the user's chosen software application.

For editing the graph, please refer to section 3.8.3 – Editing Graphs and Charts.

3.10. Special features

3.10.1. Importing from a spreadsheet

This feature allows for the importing of data from a Microsoft Excel (or compatible) spreadsheet into WLC Evaluator.

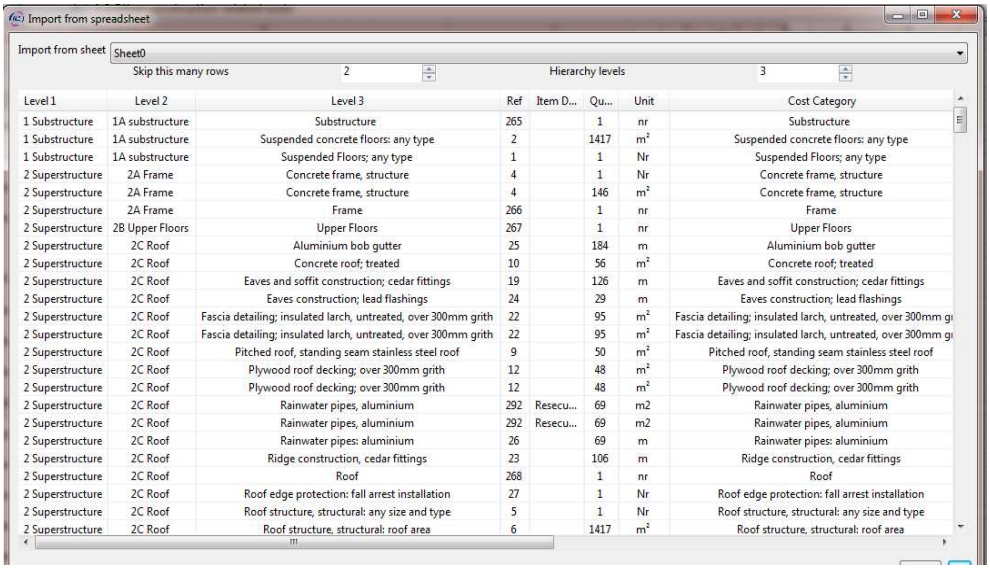
This may take the form of a Bill of Quantities, a Life Cycle replacement schedule, Maintenance schedule or any other LCC or WLC data held within a spreadsheet.

To import from Excel:

- Find and open the data in Excel
- In the spreadsheet, edit the bill into its simplest format i.e. Unhide columns, normal view, cell formatting, auto fit column selection etc, all of which may adversely affect the import
- From the description, allocate headings to the appropriate headings shown in Table 2.
- You can import as many levels of the WBS as required, but you must specified these the first consecutive columns of the sheet.

Table 2 – Import columns

Import fields
Level 1 of WBS
Level 2 of WBS
Level 3 of WBS (and further columns if necessary)
Reference
Item Description
Quantity
Unit
Cost Category
Cost Name
Cost Type
Cost description
Criticality
First instance
First instance unit
Time between
Interval unit
Last instance
Last instance unit
Task frequency per interval
Type of interval
Intervals per year
% of element affected
Probability (%)
% of construction cost
Cost per unit



Level 1	Level 2	Level 3	Ref	Item D...	Qu...	Unit	Cost Category
1 Substructure	1A substructure	Substructure	265		1	nr	Substructure
1 Substructure	1A substructure	Suspended concrete floors: any type	2		1417	m^2	Suspended concrete floors: any type
1 Substructure	1A substructure	Suspended Floors; any type	1		1	Nr	Suspended Floors; any type
2 Superstructure	2A Frame	Concrete frame, structure	4		1	Nr	Concrete frame, structure
2 Superstructure	2A Frame	Concrete frame, structure	4		146	m^2	Concrete frame, structure
2 Superstructure	2A Frame	Frame	266		1	nr	Frame
2 Superstructure	2B Upper Floors	Upper Floors	267		1	nr	Upper Floors
2 Superstructure	2C Roof	Aluminium bob gutter	25		184	m	Aluminium bob gutter
2 Superstructure	2C Roof	Concrete roof; treated	10		56	m^2	Concrete roof; treated
2 Superstructure	2C Roof	Eaves and soffit construction; cedar fittings	19		126	m	Eaves and soffit construction; cedar fittings
2 Superstructure	2C Roof	Eaves construction; lead flashings	24		29	m	Eaves construction; lead flashings
2 Superstructure	2C Roof	Fascia detailing; insulated larch, untreated, over 300mm grith	22		95	m^2	Fascia detailing; insulated larch, untreated, over 300mm gr
2 Superstructure	2C Roof	Fascia detailing; insulated larch, untreated, over 300mm grith	22		95	m^2	Fascia detailing; insulated larch, untreated, over 300mm gr
2 Superstructure	2C Roof	Pitched roof, standing seam stainless steel roof	9		50	m^2	Pitched roof, standing seam stainless steel roof
2 Superstructure	2C Roof	Plywood roof decking; over 300mm grith	12		48	m^2	Plywood roof decking; over 300mm grith
2 Superstructure	2C Roof	Plywood roof decking; over 300mm grith	12		48	m^2	Plywood roof decking; over 300mm grith
2 Superstructure	2C Roof	Rainwater pipes, aluminium	292	Resecu...	69	m2	Rainwater pipes, aluminium
2 Superstructure	2C Roof	Rainwater pipes, aluminium	292	Resecu...	69	m2	Rainwater pipes, aluminium
2 Superstructure	2C Roof	Rainwater pipes: aluminium	26		69	m	Rainwater pipes: aluminium
2 Superstructure	2C Roof	Ridge construction, cedar fittings	23		106	m	Ridge construction, cedar fittings
2 Superstructure	2C Roof	Roof	268		1	nr	Roof
2 Superstructure	2C Roof	Roof edge protection: fall arrest installation	27		1	Nr	Roof edge protection: fall arrest installation
2 Superstructure	2C Roof	Roof structure, structural: any size and type	5		1	Nr	Roof structure, structural: any size and type
2 Superstructure	2C Roof	Roof structure, structural: roof area	6		1417	m^2	Roof structure, structural: roof area

Figure 23 – Importing from a spreadsheet

If no data exists for a particular column then this column should be left blank.

Repeat these steps until every task has been entered within your spreadsheet then, when your spreadsheet is complete

- Select **File** from the main menu, then from the drop down menu
- Click **Import**, this opens the Excel **Import** window
- In the import window select the file name to import
- Click **Open** to open the **Import From Spreadsheet** window
- Click on the **Import From Sheet** dropdown menu and select the sheet number of the Excel spreadsheet to import as shown in Figure 23.

Selecting the sheet imports the data from the Excel spreadsheet into the **import from spreadsheet window.**

Skip this many rows is an option within the **import from spreadsheet** window which allows rows to be excluded at the top of your spreadsheet that are not required to be transferred to the WLC analysis. These rows may contain a title bar or column headings for the spreadsheet which should not be imported..

Clicking **OK** imports, the whole of the data within the Excel worksheet into the WLC Evaluator file.

3.10.2. Organising the structure

Use normal windows drag-and-drop operations to organise the WBS and CBS structures.

The Work Breakdown Structure and Cost Breakdown Structures can also be organised alphabetically or re-ordered by reversing the structure from top to bottom or bottom to top.

To organise the structures alphabetically:

- Highlight the heading of the structure that requires sorting
- Select **Edit** from the main menu, then from the drop down menu
- Click **Sort**

This sorts the structure into alphabetical order.

3.10.3. Defining a custom equation

Users can define custom equations to define costs. To do this, select **custom equation** from the cost parameters.

This opens a box which allows the variables to be defined. Fixed Variables can be given any name (without spaces), and then assigned a value using the equal (=) symbol.

The total cost can then be calculated using the following notation:

- Add (+)
- Subtract (-)
- Multiply (*)
- Divide (/)
- To the power (^)

An example is shown in Figure 24.

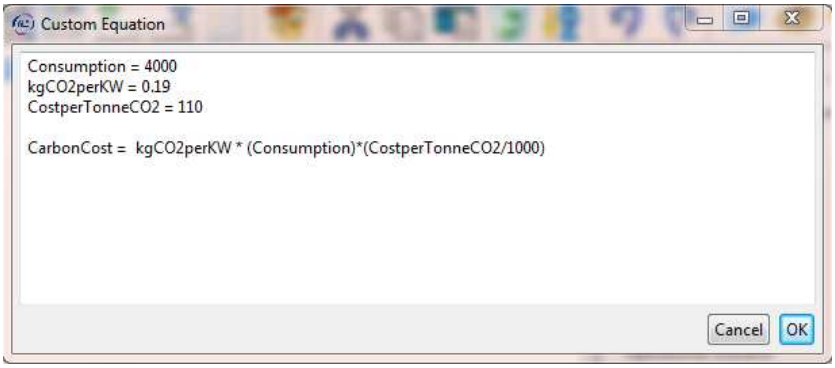


Figure 24 – Entering costs as a custom equation

3.10.4. Using reverse

To reverse the order of your structure:

- Highlight the heading of the structure that requires re-ordering
- Select **Edit** from the main menu, then from the drop down menu
- Click **Reverse**

This reverses the order of your structure.

3.10.5. Moving costs within and between projects

It is possible to move costs both within projects and between projects. This can be done by either:

- Selecting items on the WBS/CBS and dragging these whilst holding down the left mouse button into the new position
- Select the items and either copy or cut (select from menu, toolbar or right-click) and paste into the new location.

3.10.6. Saving as a template

The **Save As Template** is a standardised file type used as a pre-formatted example on which to base other files

To save a standard template:

e) Select **File** from the main menu, then from the drop down menu
f) Click **Save As** Template and insert the file name

This option allows a template of the project to be saved.

This can be particularly useful for recording specifically designed Work Breakdown Structures perhaps for similar buildings within the same scheme.

3.10.7. Example WLC Evaluator project files

An example file is supplied with WLC Evaluator and can be accessed from the help menu. This example examines a window example.

3.10.8. Assigning cost types

It is possible to user define where costs of a particular type are stored within the cost breakdown structure.

To do this, build the cost breakdown structure as shown in section 3.6. Then, on each of the elements within the cost breakdown structure you must assign the type of cost.

Costs must be assigned to one of the nine cost types:

- Construction
- Maintenance
- Operation
- Occupancy
- End of life
- Non-construction
- Income
- Externalities
- Other

To assign a cost, right click on the cost and select **Assign Cost Types**. You can then select the cost type that you wish that cost to be assigned to.

When you insert a new cost to the work breakdown structure and select the cost type and the element you recently assigned. This will put the cost into the WBS and the corresponding element of the CBS. When adding costs to the CBS directly there is only the option of the nine costs above as the position in the structure is already selected.

Costs need only be assigned once and are stored in the project file. The project can then be saved as a template for future use.

PART 4: WHERE TO FIND HELP

There are various sources of assistance when using WLC Evaluator. In the first instance, the easiest source of reference is the WLC Evaluator help file. The following is a brief description of how to access the WLC Evaluator help file.

4.1. Online help

The WLC Evaluator help file can be accessed by selecting the Help drop down menu. The Whole Life Cost Evaluator User Manual can be viewed in a separate window.

When help is selected by selecting 'About WLC Evaluator' from the Help menu, information relating to the software version and build can be viewed. Clicking on support information opens a direct link to the support pages for Whole Life Consultants Ltd.

For more details about searching for help, refer to the section titled “Using Search”.

4.2. Get an online demonstration

It is possible to arrange an online demonstration to resolve any issues you are having with the application or to introduce you to it. Please email us at support@wlcsoftware.com for more details.

4.3. Contacting WLC Evaluator technical support

Further to the information contained in this document, the WLC Evaluator Technical Support Department can be contacted at:

WLC Software Limited
Dundee University Incubator
James Lindsay Place
Dundee DD1 5JJ
United Kingdom

Phone/Fax Number: +44 (0)1382 224304

Our Home Page: http://www.wlcsoftware.com/WLCE

Support E-Mail: support@wlcsoftware.com

When contacting Technical Support, please ensure that the following information is available:

- Product version number, found by choosing Help>About WLC Evaluator from the main menu in WLC Evaluator
- The type of computer hardware you are using.
- The version of your operating system.
- Exact wording of any messages that appear on your screen

4.4. References

BS ISO 15686-5 (2008) Building and constructed assets – Service life planning; Part 5 – life cycle costing, BSI, London

BSI (2008), Standardized Method of Life Cycle Costing for Construction Procurement, BSI, London

APPENDIX A – WLC EVALUATOR GLOSSARY OF TERMS, ABBREVIATIONS AND DEFINITIONS

About WLC evaluator	Information relating to the software version and build can be accessed from the Help menu. Clicking on support information opens a direct link to the support pages for Whole Life Consultants Ltd.
Bar chart or bar graph	Charts with rectangular bars with lengths proportional to the values that they represent. Bar charts are used for comparing two or more values. The bars can be horizontally or vertically oriented.
Base year of analysis	The year upon which the LCC/WLC is carried out/analysed.
Bill of quantities (BoQ)	A document item listing the data required to construct, maintain, or repair a structure or device.
Blank project	The main storage area for all data pertaining to your analysis. The blank project does not contain either a WBS or a CBS and therefore is suitable for the users own structured input.
Building information	Specific building details e.g. building type, form of construction, function of the building, number of storeys, gross floor area and net floor area.
Capital costs	Costs incurred in the purchase of land, buildings, construction and equipment to be used in the production of goods or the rendering of services.
Client definable costs	Maintenance related costs that the client wants to include in the Life Cycle Cost Analysis.
Client information	Details such as the organisation name, address and contact name relating to the client.
Close	Used to close the current project.
Code	This can be the user's own coding system, a BoQ (Bill of Quantities) reference, NBS (National Building Specification) coding, or SMM7 (Standard Method of Measurement) reference coding.
Construction (costs)	Payable normally by the client for and in connection with the initial new building works and/or refurbishment works.
Contact	Contact details for the software producer Whole Life Consultants Ltd who provide technical support for WLC Evaluator.
Copy	A function that allows the user to copy text that can be copied elsewhere with the paste function.
Copy graph/table	A function that allows the user to copy the viewing option selected.
Cost	A field that allows the user to insert a new cost within the CBS.
Cost breakdown structure (CBS)	The result of a project/program planning that establishes all WLC and LCC that completely define a project.
Cost data	All cost information associated with a particular task.
Cost details	Description of the named elements of a task and its criticality.
Cost history	Continually updated information regarding the basis of project costs.
Cost multiplier	A percentage multiplier which allows all project costs to be multiplied by a pre-determined factor.
Cost notes	General information about new costs
Cost parameters	Variables kept constant during the calculation.

Criticality	The severity/urgency of the task which may be defined as discretionary, statutory, or essential.
Cumulative (frequency graph)	A graph plotted from a cumulative frequency table. The cumulative frequency is the frequency of a random variable below a particular level. It tells how often the value of the random variable is less than or equal to a particular reference value.
Custom equation	This pricing method allows users to insert their own equation to evaluate the cost of the task.
Cut	A function that allows the user to remove text that can be placed elsewhere with the paste function.
Delete	A function that allows the user to permanently erase text.
Detailed LCC analysis	A detailed life cycle costing analysis will normally be based on the proposed design detailing and quantum of individual elements or components of the constructed assets. These are then summed to produce a life cycle cost estimate based on first principles. As the design evolves the impact of the specific options will be tested to assess the impact on the overall cost (and other project performance requirements, such as time to complete the work) The level of analysis will include specific consideration of service life planning of the proposed design of composite items. More detailed service lives for particular assets will be considered to evaluate and inform specification choices.
Discount rate	The interest percentage rate used to determine the present value of future cash flows.
Discretionary	A task for which the user decides the level of necessity.
Disposal (costs)	Costs payable and credits accruing at the end of the period of analysis.
Element	The item to which the cost applies (term taken from the BCIS Standard form of Cost Analysis)
End of life (costs)	Costs payable and credits accruing at the end of the period of analysis.
Essential	Where a point of criticality has been reached when a task must be carried out.
Exit	A function that allows the user to close all active project(s) and then exit WLC Evaluator.
Export	A function that allows for the exporting of data from the LCC or WLC analysis into the format of a Microsoft Excel (or compatible) spreadsheet.
External works	All works to the site excluding the structure.
Externalities	Costs associated with the asset, which are not necessarily reflected in the transaction costs between provider and consumer and other client defined externalities.
Filled line graph	A simple line graph (one data series) with the area between the line and the axis filled with a colour, pattern, or shading.
Finishes	The final finish applied to walls floors and ceilings. Preparatory work and finishes to surfaces of walls, to floor surfaces and ceilings.
Fittings, fixtures and furniture (loose, fixed)	Furniture, appliances and other movable and non-moveable components/accessories that are not related to the structure of the

	building.
Fixed unit rate	A pricing method that allows the user to input a fixed unit rate for the task based on the cost per unit of the task.
Element	The name of the group element to which the cost applies (taken from the BCIS Standard form of Cost Analysis).
Help	Gives the user access to the WLC Evaluator help files. When help is selected from the drop down menu the Whole Life Cost Evaluator User Manual can be viewed by a simple search feature that allows you to find any word or phrase in all of the text in the online help system.
Import	A function that allows for the importing of data from an Excel (or compatible) spreadsheet into the LCC or WLC analysis.
Include all costs on graph	Allows the user to view and compare multiple costs on the same graph i.e. multiple element costs, multiple life cycle cost categories, multiple project phases.
Income	Costs which may wholly or partially include money received from sales, third parties, taxes, and client definable income.
Information	Comprises the specific project details upon which the whole life cost is based.
Interval	Specified periods during the analysis which may be recorded as monthly, quarterly, bi-annual or annually.
ISO15686	When this option is selected, the WBS and a CBS for the project aligns with the BS ISO 15686-5:2008 Buildings and Constructed Assets. Service Life Planning. Lifecycle Costing and The Standardised Method of Lifecycle Costing (SMLCC). This is the UK practise guidance to the standard which aligns elements for buildings in the BCIS Standard Form of Cost Analysis and enables buildings to be compared and to report the results in a consistent manner.
Item data	All information associated with a particular element excluding cost data e.g. quantity or amount, unit of measurement or code (referencing).
Labour/plant/material	This pricing method allows the user to build up a unit rate by inputting separate labour, plant and material costs for the task.
Life cycle cost (LCC)	The cost of an asset or its parts throughout its life cycle, while fulfilling the performance requirements.
Cost category	The cost category to which the cost applies.
Life cycle replacement	Provision for the replacement and renewal of the building and its components over its life cycle.
Life expectancy	The average number of years of life remaining at a given age.
Line graph	This shows the relationship between two variables or sets of numbers by plotting points in relation to two axes drawn at right angles.
Maintenance costs	The total labour, material and other related costs incurred to retain a building or its parts in a state in which it can perform its required function.
New	A function that allows the user to create a new file/project.
No graph	When this option is selected, no graph is displayed on screen (this is the default setting for WLC Evaluator).

Non construction costs	Costs which may wholly or partially include land and enabling works, finance, rental, user support, taxes and other user definable costs.
Occupancy (costs)	User support costs relating to the occupation of the building.
Open	This function allows the user to open a saved project.
Open recent	This function allows the user to quickly open one of the last ten documents worked upon.
Operational (costs)	Costs incurred in running and managing a facility, including administration support services.
Operational scenario	A description of an imagined sequence of events that includes the number of times a task must be administered e.g. days per week and weeks per year.
Paste	This function allows the user to insert the text that has been previously cut or copied.
Percentage of construction costs	This pricing method allocates a percentage to the total construction costs.
Percentage of elements affected	The percentage of elements to be affected by the operation of this task.
Period of analysis	The time period upon which the analysis is based, recorded in years.
Period to first instance	The time period until the first task is carried out.
Period to last instance	The overall time period over which this task applies.
Pie chart	A circular chart cut by radii into segments illustrating relative magnitudes or frequencies.
Planned preventative maintenance (PPM)	A schedule of planned maintenance actions aimed at the prevention of breakdowns and failure of equipment or components before it actually occurs.
Preliminaries	Items of an organisational and general nature which affect the cost of the works but which are not restricted to any particular works section.
Present cost	The cost of the task based on the present day value.
Pricing method	The method of pricing used for pricing this task.
Print	This function allows the user to print the project.
Print preview	This function allows the user to preview the selected option before printing.
Probability of this cost applying	The likelihood or chance of this cost applying.
Project capacity	Typically, an initial (budget) cost analysis will be based on the functional unit (e.g. cost per bed) or total area of the asset (e.g. in cost per square metres) or on the number of persons accommodated (e.g. in a school, prison or office. With more time the LCC cost model can be calculated in the form of an elemental level analysis using an integrated life cycle cost structure, which will improve the accuracy of the estimating.
Project file	The main storage areas for all data pertaining to an analysis or project.
Project information	Project details e.g. project name, project type, project phase, location, type of contract, contract period and project capacity.

Project settings	Specific project circumstances for the current WLC analysis comprising: Project Timing, Financial and Cost Multiplying Factors.
Quantity or amount	The total number of units (quantity) of the item.
Redo	Erases the last change done to the project reverting it to an older state.
Rename	A function that allows the user to rename an element or cost.
Revenue	The amount of money that a company actually receives during a specific period, including discounts and deductions.
Reverse	Reverses the order of your Work Breakdown Structure or Cost Breakdown Structure items.
Save	A function that allows the user to save changes to the project periodically whilst continuing to work on an active project.
Save as	A function that allows the user to insert a project name before saving the document.
Save as template	A standardised, pre-formatted example on which to base other files.
Services	The mechanical and electrical works and components to the structure.
Site information	Site details e.g. site condition and accessibility.
Software user information	Specific user details such as name, position and address.
Sort	Allows the user to organise the WBS or CBS alphabetically.
Start date	The base date for the start of the WLC analysis.
Statutory	Required by rules and regulations.
Sub-element	The name of the sub element to which the cost applies (taken from BCIS Standard form of Cost Analysis in the default CBS)
Substructure	All the structure below ground level but including the ground floor slab.
Superstructure	All the structure above the substructure and above the ground level.
Table of values	Shows the relationship between x and y given by the equation. We can pick any value for x and use the equation to solve for y.
Task frequency	The number of times the task must be administered.
Task	Refers to a specific task or operation to which the cost applies.
Time between instances	An amount of time (once, days, weeks, months, years) between the tasks.
Undo	Erases the last change done to the project reverting it to an older state. In WLC Evaluator undo relates to text alterations only and does not operate on Elements or Costs.
Unit of measurement	The unit on which the cost is based this may be m, m^2, m^3, nr or some other unit.
Use operational scenario (tick box to activate)	If selected then an operational scenario maybe activated for the task.
Whole life cost (WLC)	All significant and relevant initial and future costs and benefits of an asset, throughout its life cycle, while fulfilling the performance requirements.
Whole life cost evaluator (WLC Evaluator) user	The reference document for novice users that explains how to use or operate the WLC Evaluator software program.

manual

Work breakdown structure (WBS)	Is the result of a project/program plan that establishes the physical work packages or elements and the activities within those packages that completely define a project. It organises the physical work packages into levels that can be developed into a summary showing the relationship of all elements of a project.